



# TUNNEL BUSINESS MAGAZINE™

OCTOBER 2017

**ADVANCED TECHNOLOGIES**  
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CHALLENGES, SAVE TIME AND MONEY

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planned to be mined by the sequential excavation method using variety of localized ground support systems. Anticipated ground conditions include: Soft ground consisting of Pleistocene-age (San-Pedro) and Pliocene-age (Fernando) formations; Some alluvium deposits and artificial fill areas above the tunnel; Tar sands comprise almost 25% of tunnel alignment; Expected water table up to 90 lf above tunnel crown; Presence of methane (CH<sub>4</sub>) and hydrogen sulfide (H<sub>2</sub>S) gases (tunnels are deemed "gassy" by OSHA). The project is 15% complete.

Production of tunnel precast concrete Liners began in November 2016. TBM manufacturer Herrenknecht has completed manufacture of the two TBMs, and the functionality tests were successfully conducted at the Herrenknecht factory in July. Delivery to LA is scheduled in November. Jet grouting of cross-passages began in November 2016. Wilshire/ La Brea Station excavation (tunnel launch point) began in July 2016.

**Tunnel Designer:** PTG/CH2M (for STS JV); **Construction Manager:** WEST JV (Stantec/Jacobs)

**Engineering/AECOM); Major Subcontractors** - TBM Manufacturer: Herrenknecht; Precast: Traylor precast; Support of Excavation/piles: Condon Johnson; Jet Grouting: Malcolm Drilling; Geotechnical instrumentation: Group Delta; Dewatering: Moretrench; Standpipe: Link Nielsen.

**Key Project Personnel:** James Cohen, Executive Officer, Program Management LACMTA; Ashok Kothari, Project Director, WSP/Parsons Brinckerhoff; (Skanska) Mike Aparicio, Mike Smithson; (Traylor) John McDonald, Matt Burdick, Richard McLane; (Shea) Jim Marquart, Jim Honcycutt.

## COLORADO

### Denver

#### Denver Water Conduit Project Michels Corporation

Michels Corporation is starting construction of five tunnels for Denver Water's Conduit 16 project for Reynolds Construction to convey water from the Ralston Reservoir to the Moffat Water Treatment Plant. The five tunnels will total 5,494 lf of 84-in. diameter steel pipeline and all appurtenances. The tunnels include: I-70 crossing, 1,575 lf, two shafts; Highway 93, 300 lf, hand tunnel steel set, 104-in. steel casing; Main Line Railroad, 133.5 lf hand tunnel steel set, 104-in. steel casing; Spur Railroad, 50 lf, digging shield 104-in. steel casing; Highway 58, 270 lf hand tunnel steel set. A 104-in. Lovat Earth Pressure Balance tunnel boring machine (EPBTBM) is being used for the two-pass tunneling; digger shields are being used for the hand tunnels. The project will be completed in early 2019.

## CONNECTICUT

### Hartford

#### South Hartford Conveyance and Storage Tunnel (SHCST) Kenny/Obayashi

The South Hartford Conveyance and Storage Tunnel (SHCST) is a 4-mile long deep rock tunnel constructed to convey and temporarily store wastewater from portions of Hartford and West Hartford during storm events. The tunnel will extend from the Hartford Water Pollution Control facility in the South Meadows of Hartford to Talcott Road in West Hartford.

When completed in 2023, the tunnel will minimize sewer overflows into the local waterways, the Connecticut River and Long Island Sound during major storm events. The SHCST project is the largest infrastructure component of the MDC's \$2.4 billion Clean Water Project and the largest contract ever awarded by the MDC.

As of July, Kenny/Obayashi had begun constructing the shafts. A \$13 million, 211-ft diameter Herrenknecht TBM will be used to drive the tunnel. The TBM was expected to ship to the site by late September or early October.

### Wethersfield

#### Goff Brook Overflow Closure Bradshaw Construction Corporation

Bradshaw will soon begin construction for a 60-in. microtunneling/conventional TBM project for 30- and 48-in. FRP sanitary sewer installations. 1,850 lf of 60-in. steel casing will be installed over four drives with a Herrenknecht AVN 1200 MTBM, with the longest drive totaling 850 lf. Ground conditions for microtunneling operations will vary between dense sand, silty gravel and siltstone, with groundwater anticipated. An additional 650 ft will be installed behind an Akkerman WM480 TBM in dry lean clay and silty sand with gravel. The project members include the Metropolitan District Commission (Owner), CH2M (Engineer) and Baltazar Contractors Inc. (General Contractor), with Bradshaw Construction performing as tunneling subcontractor. Construction is scheduled to begin in fall 2017. Project Information: Jordan Bradshaw - Project Manager; Jordan.bradshaw@bradshawcc.com.

## DISTRICT OF COLUMBIA

### Washington

#### Division H - Anacostia River Tunnel Impregilo Healy Parsons JV

This is a \$253.9 million project for DC Water with NTP given June 4, 2013, and final completion expected by March 13, 2018. The primary components of the project include 12,300 lf of 23-ft ID tunnel, approximately 100 ft deep, with 6 shafts. The tunnel is driven in heavy clay and sand/clay

with up to 3 bar pressure using EPB TBM.

The project is 91% complete by schedule. The TBM drive completed Nov. 5, 2016. The alignment crossed under the Anacostia River, several fragile utility lines, and several freeways without damage. Excavation for surface structures has been completed. Concrete placement for near surface structures and shaft internals is in full swing at 6 shaft sites. The project included a microtunnel drive, 128-in. diameter by 330-ft long, under CSX tracks that tied into the main tunnel.

Special/unique Features of the Job Included: Design-Build project; Extensive use of slurry walls; Depressurizations of lower artesian aquifer while leaving upper aquifer undisturbed; TBM advance using conveyor belt system through multiple curves with vertical belt storage unit exterior to the shaft; Steel fiber precast segmental lining; Extensive use of geotechnical instruments for monitoring TBM excavation performance; and use of compensation grouting to cross under fragile critical utilities.

**Designer:** Parsons Professional Corporation; **Construction Manager:** Gilbane; **Major Subcontractors:** Moretrench, Con-Seg, Bulldog Construction, SECA, Kelly Electric, Hess Mechanical. **TBM Manufacturer:** Herrenknecht. **Conveyor Manufacturer:** H+E.

**Project Manager:** Shane Yanagisawa; **Deputy Project Manager:** Phil Colton; **Construction Manager:** Andrea Sessena; **Quality Manager:** Rick Munzer; **Business Manager:** Ale Meillon; **Design Manager:** Jonathan Taylor; **General Superintendent:** Garry Horner; **Equipment Manager:** Chuck Tedford; **Electrical Superintendent:** Bruce Haught; **Concrete Superintendents:** Jimmy Hill, Robb Brunner, Stuart Casasola, Tom Alexander; **Senior Concrete Engineer:** Andy Wolterman; **Construction Manager:** Scott Shylanski. **Information:** John Kennedy, (702) 524-0438.

### Washington

#### Oregon Avenue NW Sewer Rehabilitation Project - DC Water Contract 150130 Bradshaw Construction Corp.

Bradshaw is constructing a \$16.8 million sewer project the DC Water. The project consists of approximately 4,300 ft of 24-in. sewer interceptor, including 2,600 ft to be installed by microtunneling in four drives, with the longest being 1,860 f along Oregon Avenue at depths of up to 90 ft. A 60-in. casing will be tunneled using a Herrenknecht AVN-1200 MTBM, in which the 24-in. PVC carrier pipe will be installed. Subsurface conditions will consist of Tonalite rock ranging from slightly weathered to highly decomposed.

The project also includes the installation of nine access shafts, 1,500 ft of open-cut sewer installation, three live connections to the existing sewer system and the abandonment of the existing 15-in. sewer the new 24-in. one will be replacing. All work will be installed within Oregon Avenue, bordering